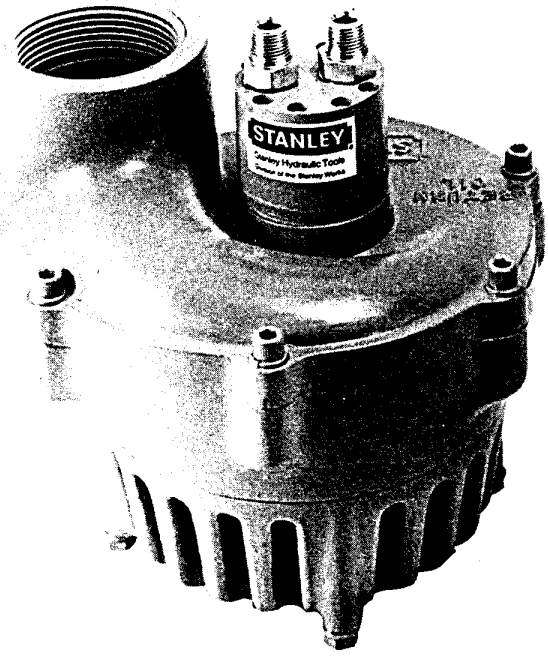
SM20
HYDRAULIC SUMP PUMP



Safety, Operation and Maintenance Manual

Focused on performance ™

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helps you do things right

10273 8/95R

SAFETY PRECAUTIONS

Tool operators and maintenance personnel must always comply with the safety precautions given in this manual and on the stickers and tags attached to the tool and hose.

These safety precautions are given for your safety. Review them carefully before operating the tool and before performing maintenance or repairs.

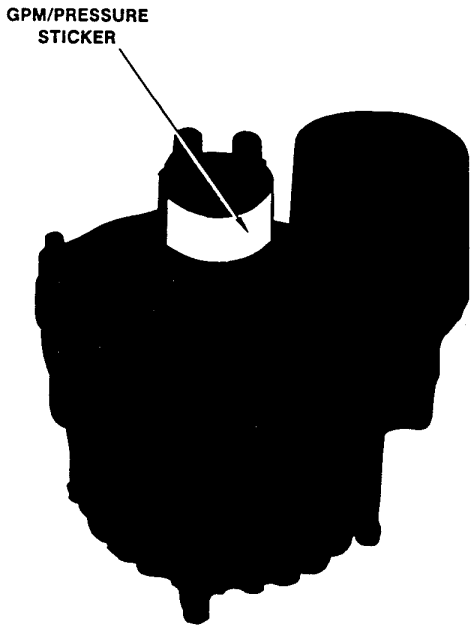
Supervising personnel should develop additional precautions relating to the specific work area and local safety regulations. If so, place the added precautions in the space provided on page 4.

GENERAL SAFETY PRECAUTIONS

The SM20 Sump Pump will provide safe and dependable service if operated in accordance with the instructions given in this manual. Read and understand this manual and any safety stickers and tags attached to the pump and hose before operation. Failure to do so can result in personal injury or equipment damage.

- Operators must start in a work area without bystanders. The operator must be familiar with all prohibited work areas such as excessive slopes and dangerous terrain conditions.
- Establish a training program for all operators to ensure safe operation.
- Do not operate the tool unless thoroughly trained or under the supervision of an instructor.
- Always wear safety equipment such as goggles, ear and head protection, and safety shoes at all times when operating the tool.
- Never use tools near energized transmission lines. Know the location of buried or covered services before starting work.
- Never wear loose clothing that can get entangled in the working parts of the tool.
- Do not overreach. Maintain proper footing and balance at all times.
- Do not inspect or clean the tool while the hydraulic power source is connected. Accidental engagement of the tool can cause serious injury.
- Always connect hoses to the tool hose couplers before energizing the hydraulic power source. Be sure all hose connections are tight.
- Do not put hand under volute while the pump is running.
- To avoid personal injury or equipment damage, all tool repair, maintenance and service must only be performed by authorized and properly trained personnel.

TOOL STICKERS AND TAGS



A flow and pressure sticker is attached to the pump at the location shown. Never exceed the flow and pressure levels specified on this sticker.

CAUTION

4-9 GPM/15-34 LPM
DO NOT EXCEED 2000 PSI/140 BAR

■DO NOT EXCEED SPECIFIED FLOW OR PRESSURE ■USE CLOSED-CENTER TOOL ON CLOSED-CENTER SYSTEM ■USE OPEN-CENTER TOOL ON OPEN-CENTER SYSTEM ■CORRECTLY CONNECT HOSES TO TOOL "IN" AND "OUT" PORTS ■IMPROPER HANDLING USE OR MAINTENANCE OF TOOL COULD RESULT IN A LEAK BURST OR OTHER TOOL FAILURE ■CONTACT AT A LEAK OR BURST CAN CAUSE OIL INJECTION INTO THE BODY ■ FAILURE TO OBSERVE THESE PRECAUTIONS CAN RESULT IN SERIOUS PERSONAL INJURY 16599

GPM/PRESSURE STICKER

The information listed on this sticker must be legible at all times. Always replace a worn or damaged sticker. A replacement is available from your local Stanley distributor.

The safety tag at right is attached to the pump when shipped from the factory. Read and understand the safety instructions listed on this tag before removal. We suggest you retain this tag and attach it to the pump when not in use.

DANGER

1. FAILURE TO USE HYDRAULIC HOSE LABELED AND CERTIFIED AS NON-CONDUCTIVE WHEN USING HYDRAULIC TOOLS ON OR NEAR ELECTRICAL LINES MAY RESULT IN DEATH OR SERIOUS INJURY.

   BEFORE USING HOSE LABELED AND CERTIFIED AS NON-CONDUCTIVE ON OR NEAR ELECTRICAL LINES BE SURE THE HOSE IS MAINTAINED AS NON-CONDUCTIVE. THE HOSE SHOULD BE REGULARLY TESTED FOR ELECTRIC CURRENT LEAKAGE IN ACCORDANCE WITH YOUR SAFETY DEPART-MENT INSTRUCTIONS.
2. A HYDRAULIC LEAK OR BURST MAY CAUSE OIL INJECTION INTO THE BODY OR CAUSE OTHER SEVERE PERSONAL INJURY.
   A. DO NOT EXCEED SPECIFIED FLOW AND PRESSURE FOR THIS TOOL. EXCESS FLOW OR PRESSURE MAY CAUSE A LEAK OR BURST.
   B. DO NOT EXCEED RATED WORKING PRESSURE OF HYDRAULIC HOSE USED WITH THIS TOOL. EXCESS PRESSURE MAY CAUSE A LEAK OR BURST.
   C. CHECK TOOL HOSE COUPLERS AND CONNECTORS DAILY FOR LEAKS. DO NOT FEEL FOR LEAKS WITH YOUR HANDS. CONTACT WITH A LEAK MAY RESULT IN SEVERE PERSONAL INJURY.

IMPORTANT

READ OPERATION MANUAL AND SAFETY INSTRUCTIONS FOR THIS TOOL BEFORE USING IT.

USE ONLY PARTS AND REPAIR PROCEDURES APPROVED BY STANLEY AND DESCRIBED IN THE OPERATION MANUAL.

TAG TO BE REMOVED ONLY BY TOOL OPERATOR.

SEE OTHER SIDE 15675

DANGER

   D. DO NOT LIFT OR CARRY TOOL BY THE HOSES. DO NOT ABUSE HOSE. DO NOT USE KINKED, TORN OR DAMAGED HOSE.
3. MAKE SURE HYDRAULIC HOSES ARE PROPERLY CONNECTED TO THE TOOL BEFORE PRESSURIZING SYSTEM. SYSTEM PRESSURE HOSE MUST ALWAYS BE CONNECTED TO TOOL "IN" PORT. SYSTEM RETURN HOSE MUST ALWAYS BE CONNECTED TO TOOL "OUT" PORT REVERSING CONNECTIONS MAY CAUSE REVERSE TOOL OPERATION WHICH CAN RESULT IN SEVERE PERSONAL INJURY.
4. DO NOT CONNECT CLOSED-CENTER TOOLS TO OPEN-CENTER HYDRAULIC SYSTEMS. THIS MAY CAUSE EXTREME SYSTEM HEAT AND/OR SEVERE PERSONAL INJURY.

   DO NOT CONNECT OPEN-CENTER TOOLS TO CLOSED-CENTER HYDRAULIC SYSTEMS. THIS MAY RESULT IN LOSS OF OTHER HYDRAULIC FUNCTIONS POWERED BY THE SAME SYSTEM AND/ OR SEVERE PERSONAL INJURY.
5. BYSTANDERS MAY BE INJURED IN YOUR WORK AREA. KEEP BYSTANDERS CLEAR OF YOUR WORK AREA.
6. WEAR HEARING, EYE, FOOT, HAND AND HEAD PROTECTION.
7. TO AVOID PERSONAL INJURY OR EQUIPMENT DAMAGE, ALL TOOL REPAIR, MAINTENANCE AND SERVICE MUST ONLY BE PERFORMED BY AUTHORIZED AND PROPERLY TRAINED PERSONNEL.

IMPORTANT

READ OPERATION MANUAL AND SAFETY INSTRUCTIONS FOR THIS TOOL BEFORE USING IT.

USE ONLY PARTS AND REPAIR PROCEDURES APPROVED BY STANLEY AND DESCRIBED IN THE OPERATION MANUAL.

TAG TO BE REMOVED ONLY BY TOOL OPERATOR.

SEE OTHER SIDE 15675

HYDRAULIC HOSE REQUIREMENTS

HOSE TYPES

Hydraulic hose types authorized for use with Stanley Hydraulic Tools are as follows:

❶ Labeled and certified non-conductive

❷ Wire braided (conductive)

❸ Fabric braided (not certified or labeled non-conductive)

Hose ❶ listed above is the only hose authorized for use near electrical conductors.

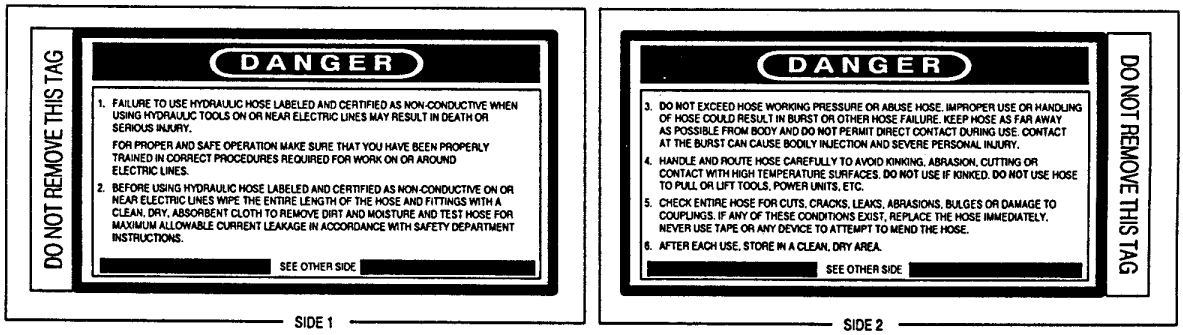
Hoses ❷ and ❸ listed above are **conductive** and **must never** be used near electrical conductors.

To help ensure your safety, the following DANGER tags are attached to all hoses purchased from Stanley Hydraulic Tools. DO NOT REMOVE THESE TAGS.

If the information on a tag is illegible because of wear or damage, replace the tag immediately. A new tag can be obtained at no charge from your Stanley distributor.

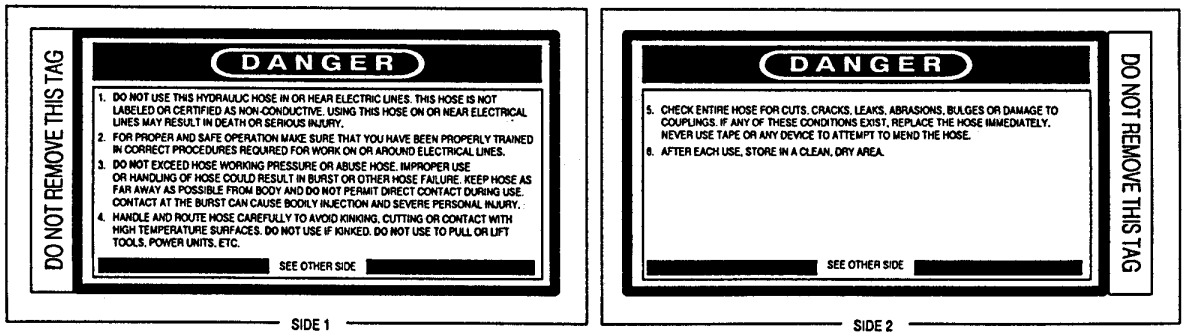
❶ CERTIFIED NON-CONDUCTIVE

This tag is attached to all certified and labeled **non-conductive** hose.



❷ AND ❸ WIRE- AND FABRIC-BRAIDED (NOT CERTIFIED OR LABELED NON-CONDUCTIVE)

This tag is attached to all **conductive** hose.



HOSE PRESSURE RATING

The rated working pressure of the hydraulic hose **must be equal to or higher than** the relief valve setting on the hydraulic system used to power the pump.

SAFETY SYMBOLS

Safety symbols are used to emphasize all operator, maintenance and repair actions which, if not strictly followed, could result in a life-threatening situation, bodily injury or damage to equipment.

DANGER

This safety symbol may appear on the tool. It is used to alert the operator of an action that could place him/her or others in a life-threatening situation.

⚠ WARNING

This safety symbol appears in these instructions to identify an action that could cause bodily injury to the operator or other personnel.

IMPORTANT

This safety symbol appears in these instructions to identify an action or condition that could result in damage to the tool or other equipment.

Always observe safety symbols,they are included for your safety and for the protection of the tool.

LOCAL SAFETY REGULATIONS

Enter any local safety regulations here. Keep these instructions in an area accessible to the operator and maintenance personnel.

OPERATION

IMPORTANT

Observe the following for Equipment protection and care

- Always keep critical tool markings, such as labels and stickers legible.
- Always replace hoses, couplings and other parts with replacement parts recommended by Stanley Hydraulic Tools. Supply hoses must have a minimum working pressure rating of 2500 psi/ 175 bar. All hoses must have an oil resistant inner surface and an abrasive resistant outer surface.
- Tool repair should be performed by trained personnel only.
- Make sure all couplers are wiped clean before connection.
- The hydraulic circuit control valve must be in the off position when coupling or uncoupling hydraulic tools. Failure to do so may result in damage to the quick couplers and cause overheating of the hydraulic system.

HYDRAULIC SYSTEM REQUIREMENTS

1. The hydraulic system should provide a flow of 4-7 gpm or 4-9 gpm/15-34 lpm depending on the pump model at an operating pressure of 1000-2000 psi/70-140 bar. Recommended relief valve setting is 2100 psi/145 bar.

2. The system should have no more than 250 psi/ 17 bar backpressure, measured at the tool end of the operating hoses. The system conditions for measurement are at maximum fluid viscosity or 400 ssu/82 centistokes (minimum operating temperatures).

3. The hydraulic system should have sufficient heat rejection capacity to limit the maximum oil temperature to 140°F/60°C at the maximum expected ambient temperature. The recommended minimum cooling capacity is 5 h.p./3.73 kw at a 40°F/22°C difference between ambient temperature and oil temperature.

4. The hydraulic system should have a minimum of 25 micron filtration. It is recommended that filter elements be sized for a flow of at least 20 to 30 gpm/75 to 113 lpm for cold temperature startup and maximum dirt holding capacity.

5. The hydraulic fluid used should have a viscosity between 100 and 400 ssu/20-82 centistokes at the maximum and minimum expected operating temperatures. Hydraulic fluids of petroleum base with anti-wear properties and viscosity indexes over 140 will meet the recommended requirements over a wide range of operating temperatures.

6. The recommended hose size is .500 inch/12 mm I.D. up to 50 ft/15 m long and .625 inch/16 mm I.D. minimum up to 100 ft/30 m long.

PREOPERATION PROCEDURES

CHECK POWER SOURCE

1. Using a calibrated flow meter and pressure gauge, check that the hydraulic power source develops a flow of 4-7 gpm or 4-9 gpm/15-34 lpm at 1000-2000 psi/70-140 bar.

2. Make certain that the power source is equipped with a relief valve set to crack at 2100 psi/145 bar maximum.

3. Check that the pump inlet screen and outlet hose are clean. Remove any obstruction before operating the pump. Refer to PUMP CLEANING PROCEDURES.

CONNECT HOSES

1. Wipe all hose couplers with a clean, lint free cloth before making connections.

2. Connect the hoses from the power supply to the tool fittings. It is a good practice to connect return hoses first and disconnect last to minimize or avoid trapped pressure within the tool.

3. If hose couplers are used, observe the arrow on the coupler to ensure that the flow is in the proper direction. The female coupler on the tool port is the inlet pressure coupler. This coupler should be connected to the port closest to the water outlet.

PUMP OPERATION

Note: The SM20 pump is NOT DESIGNED FOR USE WITH A SUCTION PIPE INLET. The diameter of the suction of the suction screen at the bottom of the pump provides maximum pump efficiency. Reducing the size of this inlet will greatly reduce pump performance.

1. Connect a hose fitted with a 2-1/2 inch/63.5 mm male pipe end to the pump outlet fitting. Make sure the fitting is securely tightened.

2. Lower the pump into the liquid to be pumped. Locate the outlet end of the discharge hose to disperse the liquid as required. Remove any kinks from the hose to assure maximum water flow.

⚠ WARNING

Never point the end of the hose at bystanders.

3. Energize the power source. Watch for solids in the liquid being pumped. If solids are excessive, the discharge flow may decrease. If this happens, stop the pump and check for the cause of the problem.

Under some conditions, **the liquid being pumped may be slowed enough so that it can no longer push particles in the liquid. If this happens, particles can accumulate in the hose and back up to the pumping chamber,** causing further restriction. The impeller then acts as a "grinding wheel" which causes accelerated pump wear. Reduced liquid flow can be caused by the following:

- The pump sinks into solids at the bottom of the hole.
- The end of the outlet hose is too high, causing excessive lift height for the column of liquid being pushed by the pump. This slows the flow of liquid to a level where it can no longer carry solids out the hose end.
- The flow and pressure of hydraulic oil to the pump is too low which reduces impeller speed. A 20 percent decrease in hydraulic oil flow can reduce pump performance by 50 percent. When operating at reduced hydraulic flow and pressure, the end of the outlet hose should not be more than 40 feet above the liquid.

4. When pumping is completed, set the hydraulic flow control valve at the power source to OFF, then lift the pump from the hole or chamber.

WHEN PUMPING WATER MIXED WITH SOLIDS

- Do not use a nozzle.
- Remove all hose kinks before starting the pump.
- Do not lift water mixed with solids over 40 feet (12 m) if hydraulic flow from the power source is less than 7 gpm/26 lpm.
- If output flow from the water hose drops during operation, clean out the hose to remove all obstructions. Check for kinks in the hose.

Note: Always **keep water speed as fast as possible** during operation. This helps to pump solids through the hose and keeps the pump clean for longer life.

COLD WEATHER OPERATION

If the pump is to be used during cold weather, preheat the hydraulic oil at low engine speed prior to use, when using the normally recommended oils, oil should be at or above 50°F/10°C (400 ssu/ 82 centistokes) before use. Damage to the hydraulic system or pump can result from use with oil that is too viscous or thick.

SERVICE INSTRUCTIONS

⚠ WARNING

Disconnect the pump from the hydraulic circuit before perfoming any service on the pump.

CLEANING THE PUMPING CHAMBER

Debris such as weeds, sand and other solids may become trapped in the water hose and pumping chamber. This can reduce pump performance. It is important that the pumping chamber be kept clean at all times. The chamber can be cleaned as follows:

1. Remove the suction screen by removing the four 5/16-18 x 2-3/4 hex head capscrews and lockwashers.

2. Remove any debris from the pump screen.

3. Remove the seven 5/16-18 x 1-1/4 socket head capscrews securing the volute top to the volute bottom. Separate the two volute halves to expose the impeller.

4. Thoroughly clean the volutes and impeller. Do not remove the impeller unless necessary for repair or replacement or to remove trapped debris.

5. Assemble the volutes and suction screen. Clean the capscrews and lubricate the threads with underwater grease before installation.

6. Remove all debris from the hose. Otherwise, solids will backfill the pump.

CHECKING THE MAIN SHAFT SEAL

1. Separate the volute top and bottom.

2. Remove the impeller by removing the 1/4-20 x 1/2 stainless steel capscrew. Pull evenly around the diameter of the impeller to pull it loose from the motor shaft. Be careful not to lose the needle roller key.

3. Thoroughly clean the area around the main shaft. Make sure the shaft is clean and dry before proceeding to step 4.

4. Conncect the pump to a hydraulic power supply as described in the OPERATION section of this manual. Apply hydraulic power to the pump motor. Carefully check for oil leaks around the seal and main shaft.

5. If oil leaks are present around the shaft, remove the motor and replace the main shaft seal as described in the following paragraph.

6. If oil leakage is detected at the volute top casting, the casting may be cracked and must be replaced.

MOTOR REMOVAL AND INSTALLATION SEAL REPAIR

Note: Pump serial numbers 1547 and up have a bronze gland seal to seal the pump shaft at the volute top. Serial numbers 1546 and lower use a cup seal. Be sure to order the correct repair and seal kits as specified in the following paragraphs.

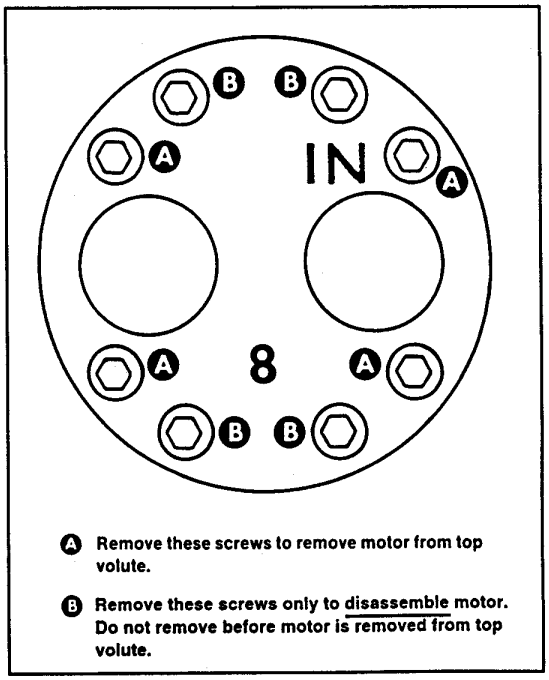


Figure 1. Motor Mounting Screws

REMOVAL (Pump Serial Number 1546 and lower

1. Obtain seal kit Part Number 10318 or repair kit Part Number 10317 if damage is suspected.

2. Separate the volute top and volute bottom by removing the seven 5/16-18 x 1-1/4 socket head capscrews at the top volute.

3. Remove the impeller by removing the 1/4-20 x 1/2 stainless steel capscrew.

IMPORTANT

- **Do not attempt to remove the motor until the impeller has been removed.**
- **Do not allow the mainshaft to slide from the motor unless the drive gear and needle roller have been removed.**

4. Remove ONLY the four 10-24 x 3 hex socket head capscrews, marked "A" in Figure 1, then PUSH on the MAINSHAFT end to remove the assembled motor from the volute top.

5. If oil leakage around the mainshaft is evident, the cup seal must be replaced. The seal is shown in Figure 2 and is supplied in the seal kit.

6. Inspact the seal surfaces on the mainshaft. If damage is evident, the mainshaft must be replaced.

INSTALLATION

1. If there has been leakage around the mainshaft or if shaft damage is evident, install a new main shaft seal in the volute top. Lubricate the seal with waterproof grease. The seal lips must face outward toward the motor.

2. Place the back-up washer on the seal, with small diameter toward the seal.

3. Place a bearing race on the back-up washer, then install the greased thrust bearing and the second bearing race. Add the o-ring around the motor pilot diameter to seal.

4. Carefully insert the motor shaft through the parts assembled in steps 2 and 3. Seat the motor in the bore of the volute top, then secure in place using the four 10-24 x 3 hex head capscrews. Tighten the capscrews to 35 pound inches in a circular pattern. Rotate the motor shaft while tightening the screws to check for binding.

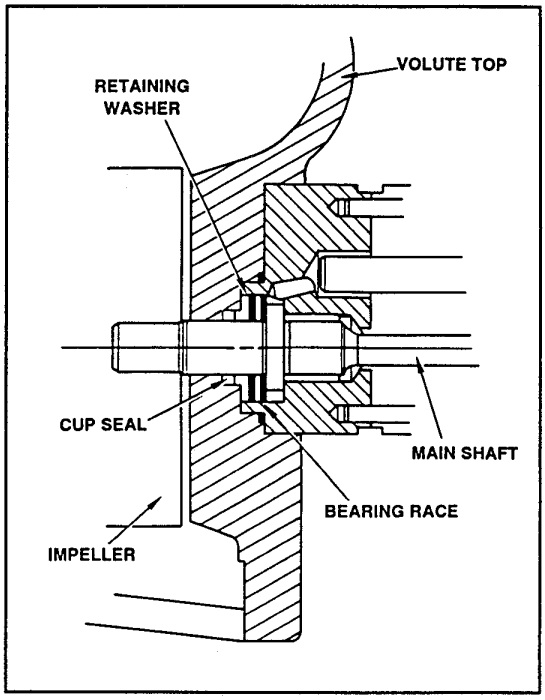


Figure 2. Cup Seal and associated parts

REMOVAL (Pump Serial Number 1547 and Up)

1. Obtain seal kit Part Number 19937 or repair kit Part Number 20135 if oil leakage is evident or if damage is suspected.

2. Separate the volute top and volute bottom by removing the seven 5/16-18 x 1-1/4 socket head capscrews at the top volute.

3. Remove the impeller by removing the 1/4-20 x 1/2 stainless steel capscrew.

IMPORTANT

- **Do not attempt to remove the motor until the impeller has been removed.**
- **Do not allow the mainshaft to slide from the motor unless the drive gear and needle roller have been removed.**

4. Remove ONLY the four 10-24 hex socket head capscrews, marked "A" in Figure 1, then PUSH on the MAINSHAFT end to remove the assembled motor from the volute top.

5. If oil leakage around the mainshaft is evident, the bronze gland seal and associated parts must be replaced. These parts are shown in Figure 3

and are supplied in the seal kit.

6. Inspect the seal surfaces on the mainshaft. If damage is evident, the mainshaft must be replaced. Refer to MOTOR INSPECTION AND CLEANING.

INSTALLATION

1. If there has been leakage around the mainshaft or if shaft damage is evident, install a new wiper seal, bronze gland seal, gland seal o-ring, quad ring and backup ring in the volute top as shown in Figure 3 before installing the motor. Lubricate the bronze gland seal, wiper seal and quad ring with waterproof grease before installation. Lubricate all other parts with clean hydraulic fluid.

Note: The lip of the wiper seal must face down toward the impeller side of the volute top. The gland seal must be installed so the quad ring faces the motor. Make sure the quad ring fits evenly inside the bore of the bronze gland seal and that it is not twisted.

2. Place a bearing race against the back-up ring installed in step 1. Lubricate the thrust bearing with waterproof grease, then install it against the bearing race. Install the second bearing race.

3. Install the large o-ring in the volute top to seal the motor front.

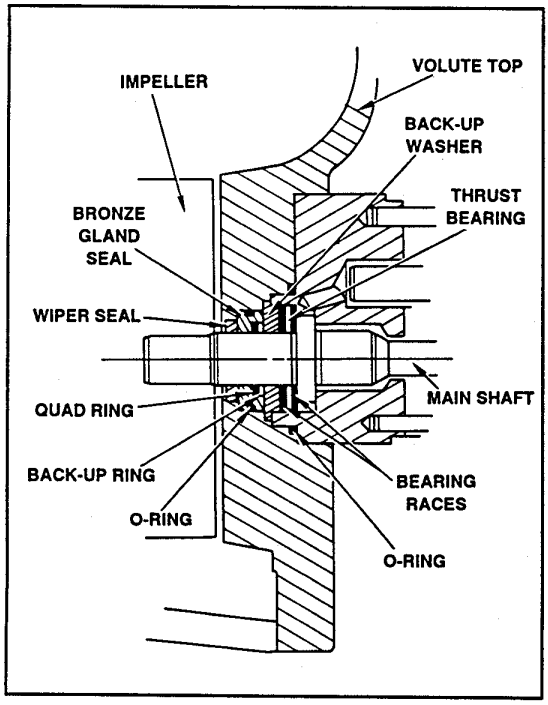


Figure 3. Bronze Gland Seal and associated parts. For serial number 1547 and up.

4. Carefully insert the motor shaft through the parts assembled in steps 1 through 3. Seat the motor in the bore of the volute top, then secure in place using the four 10-24 hex head capscrews. Tighten the capscrews to 35 pound inches in a circular pattern. Rotate the motor shaft while tightening the screws to check for binding.

MOTOR DISASSEMBLY AND REASSEMBLY

DISASSEMBLY

IMPORTANT

Do not pull the mainshaft from the front bearing retainer unless the needle roller and drive gear have been removed.

1. Remove the four 10-24 x 2 socket head capscrews, marked "B" in figure 1, securing the motor gear housing to the front bearing retainer.

2. Separate the housing and retainer. Do not twist the parts.

3. Remove the two gears, needle roller key, idler shaft, mainshaft and o-ring. Be careful not to damage the o-ring groove when removing the o-ring.

4. Bushings should be gray in color. If the bushings show a bronze color, they must be replaced. To remove the 3/8 inch/9.5 mm I.D. bushing from the front and rear bearing retainers, use collet Part Number 05871 and actuator pin Part Number 05872 along with a suitable slide hammer.

5. To remove the 9/16 inch/15 mm I.D. bushing from the front bearing retainer, use collet Part Number 12326 and actuator pin Part Number 05067 along with a suitable slide hammer.

IMPORTANT

Worn bushings and/or rough gear chamber areas are a sign the hydraulic fluid is contaminated. Change fluid and fix power supply filtration before another use.

MOTOR CLEANING AND INSPECTION

Cleaning

- Clean all parts with a degreasing solvent. Blow dry with compressed air and wipe clean. Always use only lint free cloths.

Bushings

- The inside of the bushing should be gray. If a significant amount of yellow-bronze shows, bushing replacement is required. Inspect motor shaft for corresponding wear and replace as required.

Gear Housing

- The gear chamber bores and end faces around the bores should be polished but not rough or grooved. The flat surfaces around the chamber and bolt holes should be flat and free of nicks or burrs that could cause misalignment or leaks.
- Both gears should have straight tips without nicks, square tooth ends and a smooth, even polish on the teeth and end faces. Check for cracks between the drive gear keyway and gear tooth root. Discard the gear if cracks are present.

Motor Housings and Retainer

- The gear face running surface should show two interconnecting polished circles without a step and should not be rough or grooved.
- The shaft seal bore should be smooth and free from nicks or scratches.

Shafts

- The shaft diameter at the bearing and seal locations must be smooth. Grooves, roughness or a reduced diameter indicate fluid contamination and damaged bushings. Grit particles may have embedded in the bushings, grinding into the hardened shaft. If abnormal shaft wear as above occurs (in excess of normal polishing) both the shaft and associated bushings must be replaced. Mainshaft Part Number 19175 can be used on both earlier and late motors.

REASSEMBLY

Note: Lubricate the o-ring, bushings and gears with multipurpose grease or hydraulic fluid during reassembly.

1. Install new bushings in the front bearing retainer and gear chamber if required. The end of the bushings must be slightly below the face of the retainer bore.

2. Install the mainshaft through the bushing in the front bearing retainer. Place the needle roller in the shaft groove, then install the drive gear on the shaft.

3. Install the idler shaft in the front bearing retainer. Install the gear on the shaft.

4. Install the large o-ring seal into the front bearing retainer. Use grease to hold the o-ring in place.

5. Carefully position the gear housing over the assembled gears and idler shaft. Seat the housing against the front bearing retainer. The capscrew holes will allow the front bearing retainer and gear housing to fit together in only one way.

6. With the gear housing correctly fitted against the front bearing retainer, install the four 10-24 x 2 socket head capscrews, marked "B" in figure 1. Tighten the capscrews to 35 pound inches (lubricated). Check that the shaft turns freely.

IMPELLER

REMOVAL

1. Separate the top volute from the bottom volute by removing the seven 5/16-18 x 1-1/4 capscrews and lockwashers.

2. Hold the impeller and remove the 1/4-20 x 1/2 stainless steel capscrew.

INSPECTION

- Check the impeller blades for cracks, chips and signs of excessive wear which can affect pump performance. Replace the impeller if damaged or seriously worn. Check to be sure that the impeller to wear ring clearance is .030 inch/.07 mm. Add or remove shims as needed.

INSTALLATION

1. Attach the impeller to the main shaft using the flatwasher and 1/4-20 x 1/2 stainless steel capscrew. Lubricate the screw threads with waterproof grease.

2. Fit the volute top and volute bottom together. Clean the seven capscrews, then lubricate with waterproof grease. Install the capscrews and tighten in a circular pattern to 8 pound feet/11 Nm.

WEAR RING

REMOVAL

1. Remove the suction screen by removing the four 5/16-18 x 2-3/4 hex head capscrews and lockwashers.

2. Remove the wear ring from the bottom volute by removing the three 1/4-20 x 1 hex head capscrews and lockwashers.

IMPORTANT

Tap the ring with a plastic hammer to separate it from the volute. Never pry on the ring with metallic tools.

3. Carefully remove the shims. Do not discard.

INSPECTION

- Carefully check the ring for cracks, deep scratches and signs of excessive wear. Scratches more than 1/16 inch/2 mm may affect pump performance. Replace the wear ring if damaged or seriously worn. Check impeller-to wear ring clearance.

INSTALLATION

1. Establish .020 inch/.05 mm clearance between the wear ring and impeller as described in IMPELLER INSPECTION.

2. Install the appropriate shims, then position the wear ring on the bottom volute. Secure in place using the three 1/4-20 x 1 hex head capscrews and lockwashers. Tighten the capscrews to 45 pound inches. Lubricate the capscrew threads with waterproof grease.

3. Install the suction screen. Secure in place using the four 5/16-18 x 2-3/4 hex head stainless steel capscrews. Tighten to 45 pound inches. Use only stainless steel capscrews with threads lubricated with waterproof grease.

IMPELLER-TO-WEAR RING CLEARANCE ADJUSTMENT

1. Remove the suction screen.

2. Remove the three 1/4-20 x 1 hex head capscrews securing the wear ring to the bottom volute.

3. Install .020 inch/.05 mm shim(s) in the groove of the bottom volute, then place the wear ring against the shim(s). Hold the wear ring in place while pulling on the impeller. Adjust the number of shims so that the clearance between the impeller blades and wear ring is .020 inch/.05 mm.

4. Install the wear ring and suction screen as described in steps 2 and 3 of WEAR RING INSTALLATION.

TROUBLESHOOTING

If symptoms of poor performance develop, the following chart can be used as a guide to correct the problem.

When diagnosing faults in operation of the pump, always check that the hydraulic power source is supplying the correct hydraulic flow and pressure to the tool as listed in the table. Use a flow meter known to be accurate. Check the flow with the hydraulic oil temperature at least 80°F/27°C.

PROBLEM	CAUSE	REMEDY
Pump will not start.	No hydraulic flow or pressure.	Turn on power unit and check that 4-9 gpm/15-34 lpm at 1000-2000 psi/70-140 bar is available at the pump.
	Defective couplers.	Check the couplers. Replace, if necessary.
	Impeller jammed with debris.	Clean the pumping chamber as described in the SERVICE INSTRUCTION section of this manual.
	Impeller rubbing against wear ring.	Check and adjust the impeller clearance as described in the SERVICE INSTRUCTION section of this manual.
	Defective hydraulic motor.	Repair or replace motor.
Poor pump performance.	Hydraulic flow reversed.	Check that hoses are correctly connected to the pump motor ports. The pressure hose should be connected to the IN port. The return oil must never flow through a reversing valve.
	Low hydraulic oil flow.	Check that 4-9 gpm/15-34 lpm at 1000-2000 psi/70/140 bar is available at the pump. A 20 percent decrease in flow can result in a 50 percent decrease in pump performance.
	Pump submersed in sediment.	Lift the pump from the bottom of the hole or chamber. Use a flat support under the pump if necessary.
	Pump inlet restricted.	Remove the suction screen and clean thoroughly. Reassemble.

PROBLEM	CAUSE	REMEDY
Poor pump performance. (continued.)	Discharge hose kinked or restricted.	Straighten the hose. If hose must bend at top of hole, use a bend of split rigid conduit with a diameter large enough to accept the diameter of the expanded hose. This will keep the hose from kinking.
		Check for debris inside the hose. Clean as required.
	Discharge hose too small.	Use 2-1/2 inch/63.5 mm diameter fire hose.
	Water lift too high for gpm supply from hydraulic power source.	Lower the outlet end of the discharge hose.
		Use up to 9 gpm/34 lpm hydraulic flow.
	Pump not matched to application.	Obtain higher capacity pump.
	Impeller worn or damaged.	Check for impeller damage and excessive wear. Replace the impeller if necessary.
	Wear ring worn or damaged.	Check for wear ring damage or excessive wear. Replace the wear ring if necessary.
	Hose used on suction side of pump.	Remove. Use no plumbing on suction side of pump.
Poor pump performance with excessive wear.	Too many solids in the water. Water speed out of the hose may be too slow, therefore hose and pump load up with solids.	Reduce solids content. Increase pump speed.

SPECIFICATIONS

Weight	13.7 lbs/6.3 kg
Overall Length	7.4 in./19 cm
Pressure Range	1000-2000 psi/70-140 bar
Flow Range	20 lpm Model 4-7 gpm/15-26 lpm 30 lpm Model 4-9 gpm/15-34 lpm
System Type	Open Center, HTMA TYPE1,2
Porting	-8 SAE o-ring
Water Outlet Size	2.5 in./6.4 cm
Drop-through Hole Diameter	9.75 in./24.7 cm

WARRANTY

Hand held tools and their parts are warranted against defects in materials and workmanship for a period of 12 months from the date of purchase, except for cutting parts, steels and other parts not manufactured by Stanley (such as impact mechanisms, alternators, regulators and hoses).

The Warranty Registration Card packed with the tool must be filled out and returned to Stanley upon receipt of the tool.

Stanley reserves the right to replace or repair only those parts which under our examination prove to have been defective at the time of purchase.

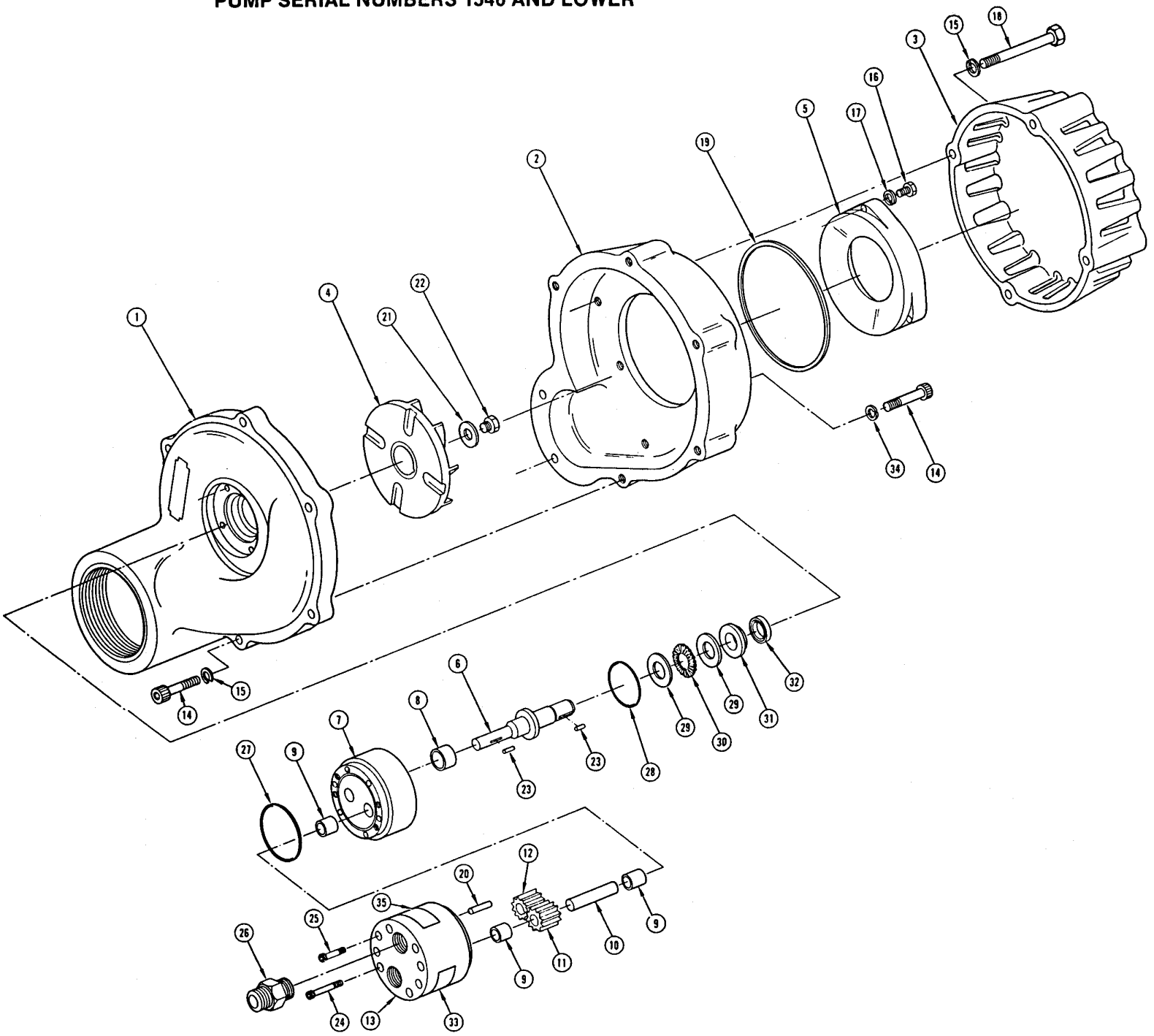
Shipping charges are pre-paid by the customer unless otherwise authorized by Stanley.

The warranty is void if maximum flow and pressure ratings are exceeded.

There is no other warranty expressed or implied.

SERVICE AND REPAIR NOTES

PUMP SERIAL NUMBERS 1546 AND LOWER



PARTS LIST

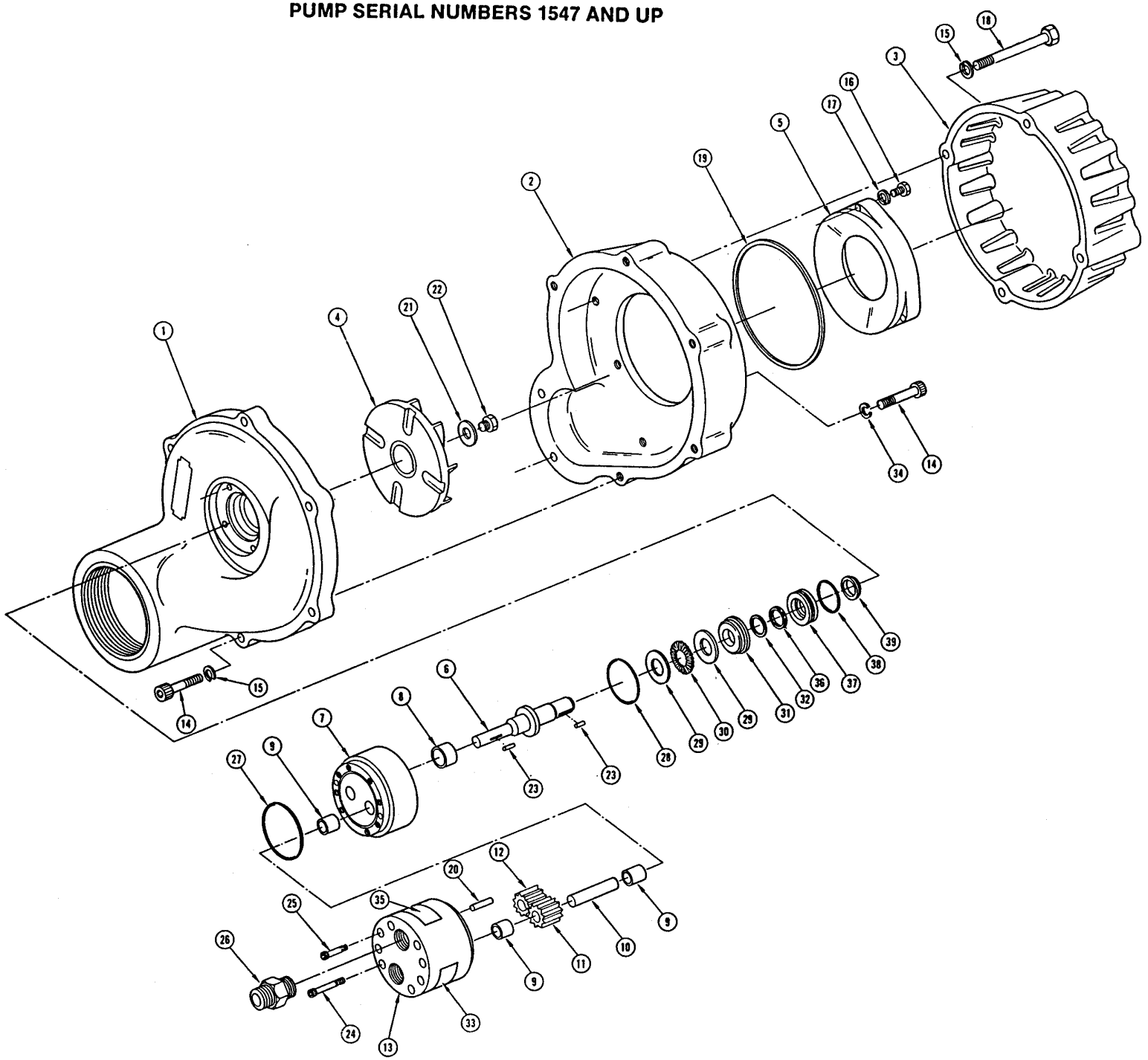
Item No.	Part No.	Qty.	Description
1	08908	1	Volute Top
2	08910	1	Volute Bottom
3	08912	1	Suction Screen
4	08914	1	Impeller *
5	08916	1	Wear Ring *
6	19175	1	Main Shaft
	08920	1	Front Bearing Ret. Assy. Includes Items 7-9
7	08919	1	Front Bearing Retainer
8	04040	1	DU Bushing — 9/16 I.D.
9	04041	3	DU Bushing — 3/8 I.D.
10	09382	1	Idler Shaft
11	09383	1	Idler Gear
12	09384	1	Drive Gear
	09385	1	Gear Housing Assy. Includes Items 9, 13 & 20
13	09388	1	Gear Housing
14	00230	7	Capscrew, Socket Head 5/16-18 x 1-1/4
15	00283	9	Lockwasher, 5/16 Plated
16	08937	3	Capscrew, 1/4-20 x 1 Hex Hd.
17	01324	3	Lockwasher, 1/4
18	08925	4	Capscrew, 5/16-18 x 2-3/4 Hex Hd. SS
19	08923	A/R	Shims, .020 Thick *
20	00289	2	Dowel Pin, 3/16 x 3/4
21	02259	1	Flat Washer
22	01213	1	Capscrew, 1/4-20 x 1/2 SS *
23	04044	2	Needle Roller *
24	08927	4	Capscrew, #10-24 x 3
25	09687	4	Capscrew, #10-24 x 2
26	00936	2	Adapter, 1/2 SAE 1-3/8 NPT Male
27	00020	1	O-Ring, 1.670 x 1.810 x .070 ⊙
28	00252	1	O-Ring, 1-3/8 x 1-1/2 x 1/16 ⊙
29	06636	2	Bearing Race *
30	06637	1	Thrust Bearing *
31	08926	1	Retaining Washer
32	03220	1	Cup Seal ⊙
33	16599	1	GPM Sticker, 4-9 GPM
34	00231	2	Lockwasher
35	08938	1	Sticker, Unit Nameplate

NOTE: Use Part Number and Part Name when ordering.
* Denotes Part in Repair Kit
⊙ Denotes Part in Seal Kit
Ⓐ Supplied as Part of Item 26

REPAIR AND SEAL KIT DATA

Part No.	Qty.	Description
Repair Kit Part No. 10317		
08916	1	Wear Ring
08923	7	Shim
08926	1	Back-Up Washer
08914	1	Impeller
01213	1	Capscrew
02259	1	Washer
04044	2	Needle Roller
06636	2	Bearing Race
06637	1	Thrust Bearing
10318	1	Seal Kit
Seal Kit Part No. 10318		
00020	1	O-Ring
00026	2	O-Ring Ⓐ
00252	1	O-Ring
03220	1	Cup Seal

PUMP SERIAL NUMBERS 1547 AND UP



PARTS LIST

Item No.	20 lpm Part No.	30 lpm Part No.	Qty.	Description
1	19177	19177	1	Volute Top
2	08910	08910	1	Volute Bottom
3	08912	08912	1	Suction Screen
4	08914	08914	1	Impeller (Urethane)
	25669	25669	1	Impeller (Steel)
5	08916	08916	1	Wear Ring
6	21120	19175	1	Main Shaft
7	08919	08919	1	Front Beraing Retainer
8	04040	04040	1	DU Bushing—9/16 I.D.
9	04041	04041	3	DU Bushing—3/8 I.D.
10	09382	09382	1	Idler Shaft
11	04105	09383	1	Idler Gear
12	04106	09384	1	Drive Gear
	09385	09385	1	Gear Housing Assy. Includes Items 9, 13 8 20
13	21121	09388	1	Gear Housing
14	00230	00230	7	Capscrew, Socket Head 5/16-18 x 1-1/4
15	00283	00283	9	LockNasher, 5/16 Plated
16	08937	08937	3	Capscrew,1/4-20 x 1 Hex Hd.
17	01324	01324	3	Lockwasher, 1/4
18	08925	08925	4	Capscrew, 5/16-18 x 2-3/4 Hex Hd. SS
19	08923	08923	A/R	Shims, .020 Thick
20	00289	00289	2	Dowel Pin, 3/16 x 3/4
21	02259	02259	1	Flat Washer
22	01213	01213	1	Capscrew,1/4-20 x 1/2 SS *
23	04044	04044	2	Needle Roller *
24		08927	4	Capscrew, #10-24 x 3
	21128		4	Capscnew, #10-24 x 2-3/4
25		09687	4	Capscrew, #10-24 x 2
	00786		4	Capscrew, #10-24 x 1 -314
26	00936	00936	2	Adapter,1/2 SAE 1-3/8 NPT Male
27	00020	00020	1	O-Ring,1.670 x 1.810 x .070 ⊙
28	00252	00252	1	O-Ring,1-3/8 x 1-1/2 x 1/16 ⊙
29	06636	06636	2	Bearing Race *
30	06637	06637	1	Thnust Bearing *
31	19178	19178	1	Thnust Back-Up Washer
32	08928	08928	1	Back-Up Ring ⊙
33	21122	16599	1	GPM Sticker
34	00231	00231	2	Lockwasher
35	08938	08938	1	Name Tag-SM20
36	02445	02445	1	Quad Ring ⊙
37	19174	19174	1	Gland, Bronze ⊙
38	00074	00074	1	O-Ring (Gland OD) ⊙
39	19176	19176	1	Wiper Seal ⊙

REPAIR AND SEAL KIT DATA

Part No.	Qty.	Description
Repair Kit Part No. 20135		
08926	1	Back-Up Washer
08914	1	Impeller
01213	1	Capscrew
02259	1	Washer
04044	2	Needle Roller
06636	2	Bearing Race
06637	1	Thrust Bearing
19937	1	Seal Kit
Seal Kit Part No. 19937		
00020	1	O-Ring
00026	2	O-Ring Ⓐ
00252	1	O-Ring
19176	1	Wiper Seal
08928	1	Back-Up Ring
00074	1	O-Ring
02445	1	Quad Ring
19174	1	Gland

NOTE: Use Part Number and Part Name when ordering.
* Denotes Part in Repair Kit
⊙ Denotes Part in Seal Kit
Ⓐ Supplied as Part of Item 26

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